DATA SHEET

CISCO CATALYST 4500 SERIES LINE CARDS

PRODUCT OVERVIEW

Fast Ethernet and Gigabit Line Cards

The Cisco® Catalyst® 4500 Series scalable, modular, high-density switches deliver high performance, and integrated Layer 2, 3, and 4 switching with intelligent services for network control and resiliency. These switches offer a variety of Fast Ethernet and Gigabit Ethernet line cards that include fiber and copper interfaces optimized for desktops, branch office backbones and servers for enterprise and commercial switching solutions, and service provider metropolitan Ethernet networks. Gigabit Ethernet line cards include cost-effective, high-performance 1000BASE-X gigabit interface converter (GBIC) and Small Form Factor Pluggable (SFP)-based Gigabit Ethernet line cards and the high density 10/100/1000BASE-T triple-speed autosensing, autonegotiating Gigabit Ethernet line cards. Fast Ethernet line cards include various densities of wire-speed 10/100, 100-FX, 100BASE-LX10, and 100BASE-BX-D options.

Power over Ethernet Line Cards

The Cisco Catalyst 4500 Series offers line cards, power supplies, and accessories required to deploy and operate a standards-based Power over Ethernet (PoE) internetwork. PoE provides—48 VDC power over standard Category 5 unshielded twisted-pair (UTP) cable up to 100 meters when an IEEE 802.3af-compliant or Cisco prestandard powered device is attached to the PoE line card port. Instead of requiring wall power, attached devices such as IP phones, wireless base stations, video cameras, and other IEEE-compliant appliances can use power provided from the Cisco Catalyst 4500 Series PoE line cards. This capability gives network administrators centralized control over power and eliminates the need to install outlets in ceilings and other out-of-the-way places where a powered device may be installed.

Although all references to “PoE,” “inline-power,” and “voice” power supplies and line cards are synonymous, there are only two versions: Cisco prestandard and IEEE 802.3af compliant. Every Cisco Catalyst 4500 Series chassis and PoE power supply supports the IEEE 802.3af standard, and the Cisco prestandard power implementation ensuring backward compatibility with existing Cisco powered devices. All IEEE 802.3af compliant line cards can distinguish an IEEE or Cisco prestandard powered device from an unpowered network interface card (NIC); ensuring power is applied only when an appropriate device is connected.

Ethernet in the First Mile

Cisco Catalyst 4500 Series line cards for delivering Ethernet in the First Mile (EFM) fulfill the high-density, high-bandwidth, and long-reach requirements of network operators to build the next-generation metropolitan-area networks. Cisco Catalyst 4500 Series EFM line cards let service providers deliver any combination of data, voice, and video services over a single optical connection to homes, business parks, and multitenant units. EFM line cards also are appropriate for manufacturing facilities, transportation monitoring, and fiber-to-the-desktop applications. Ethernet over fiber enables operation in noisy electromagnetic environments, providing physical security and longer reaches with the same well-understood Ethernet transport. EFM line cards include 1000-BASE-X, 100-FX, 100BASE-LX10, and 100BASE-BX-D for fiber-based options and 10/100 or 10/100/1000BASE-T line cards for copper-based options when media converters are used.

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FEATURES AND BENEFITS

Functionally Transparent

The Catalyst 4500 Series Switch offers an extensive line of modules that support numerous speeds and physical media combinations. These line cards are functionally transparent; all the packet processing, queuing, buffering, and QoS occur in the supervisor engine. To that end, the line cards acquire the features and capabilities of the installed supervisor engine. This architecture enables customers to easily upgrade all Ethernet line cards on their Cisco Catalyst 4500 systems to higher-layer switching functions by adding a new supervisor engine. The simple design of the line cards results in a very high mean time between failures (MTBF), helping ensure high availability for a single connection to an end user.

Modular Versatility

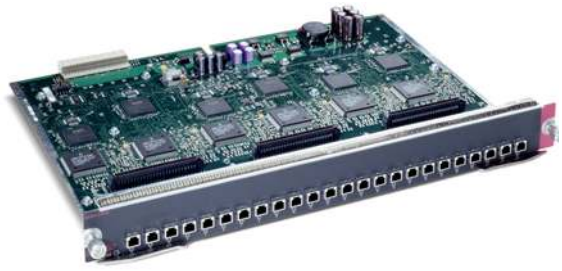
The Cisco Catalyst 4500 Series is a centralized architecture that is designed to provide dedicated wire-speed bandwidth to each line card slot within the chassis. Each line card has a dedicated bandwidth to the supervisor engine for packet processing. All network data that flows into the Catalyst 4500 Series through the various line cards goes through the supervisor engine for processing, even in single-slot port-to-port communications. All line cards have some per slot bandwidth that allows network administrators to design a system that offers full dedicated bandwidth-to-server and switch-to-switch applications and still provide high performance over subscribed Gigabit-to-the-desktop.

A modular centralized design allows customer to use their investment in high-performance line cards across the entire line of Catalyst 4500 chassis and supervisor engines. For example, line cards shipping with the original Catalyst 4003 Switch will work in the new Catalyst 4500 Series running the Cisco Catalyst 4500 Supervisor Engine V.

Following is a list of line cards that are available for the Catalyst 4500 Series Switch:

Fast Ethernet over Fiber

WS-X4124-FX-MT



- 24-port
- 100BASE-FX multimode fiber (MMF) (MT-RJ)
- Cisco IOS® Software Release 12.1(8a)EW or later
- IEEE 802.3
- Enterprise and commercial: affordable connection for fiber-to-the-desktop applications. Optimized for government or for anyone requiring the security and resiliency of fiber to the desktop.
- Metro Ethernet: residential customers located within a 1.2 mile (2 km) radius

WS-X4148-FX-MT

- 48-port
- 100BASE-FX MMF (MT-RJ)
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3
- Enterprise and commercial: affordable high-density connection for fiber-to-the-desktop applications. Optimized for government or for anyone requiring the security and resiliency of fiber to the desktop.
- Metro Ethernet: residential customers located within a 1.2 mile (2 km) radius

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WS-X4148-FE-LX-MT

- 48-port
- 100BASE-LX10 SMF (MT-RJ)
- Cisco IOS Software Release 12.1(13)EW or later
- IEEE 802.3ah, IEEE 802.3
- Metro Ethernet: Designed for both residential and small-business customers over distances up to 6.2 miles (10 km)

WS-X4148-FE-BD-LC

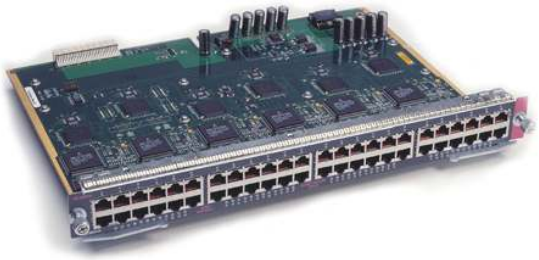
- 48-Port
- 100BASE-BX10-D for single strand of single mode fiber
- Cisco IOS Software Release 12.2(18)EW or later
- IEEE 802.3ah, IEEE 802.3
- Bidirectional Fast Ethernet operates over a single strand of fiber
- Metro Ethernet: Designed for network operators building the next-generation Metro Ethernet network over distances up to 6.2 miles (10km)

Fast Ethernet over Copper

WS-X4124-RJ45

- 24-port
- 10/100BASE-T Module (RJ-45)
- Cisco IOS Software Release 12.2(20)EW or later
- IEEE 802.3
- Enterprise and commercial: Designed for desktop connectivity and wiring closets

WS-X4148-RJ



- 48 ports
- 10/100BASE-T Module (RJ-45)
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3
- Enterprise and commercial: High port density solution for desktop connectivity

WS-X4148-RJ21

- 48-port
- telco 10/100BASE-T Module (4 x RJ-21)
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3
- Enterprise and commercial: High port density solution with improved cable management RJ-21 connectors for desktop connectivity

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WS-X4232-RJ-XX

- 32-port plus modular uplink slot
- 10/100BASE-T (RJ-45)
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3
- Provides a fiber uplink option for investment protection and a clear upgrade path
- Enterprise and commercial: High port density solution for desktop connectivity

WS-U4504-FX-MT (Uplink Daughter Card)

- 4-port uplink daughter card
- 100BASE-FX MMF (MT-RJ)
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3
- Adds four 100BASE-FX uplinks to WS-X4232-RJ-XX line card

WS-X4232-GB-RJ

- 32-port + 2-Gigabit (GBIC) ports
- 10/100BASE-T (RJ-45), 2- 1000BASE-X Gigabit Ethernet (GBIC) Module
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3
- Enterprise and commercial: Designed for desktop connectivity with additional Gigabit Ethernet uplinks
- Metro Ethernet: Long distance fiber uplink

Fast Ethernet Power over Ethernet

WS-X4148-RJ45V

- 48-port
- Cisco prestandard 10/100 (RJ-45)
- Cisco IOS Software Release 12.1(8a)EW minimum for data, Cisco IOS Software Release 12.1(11b)EW minimum for power
- NOT IEEE 802.3af compliant (Cisco prestandard only)
- PoE provides −48 VDC power over standard Category 5 cable
- Enterprise and commercial: Designed for desktop connectivity and to power IP phones, wireless access points or any other Cisco prestandard PoE device.

WS-X4224-RJ45V

- 24-port
- 10/100 (RJ-45)
- Cisco IOS Software Release 12.2(20)EW or later
- IEEE 802.3af PoE and Cisco prestandard PoE
- Enterprise and commercial: Designed to power IP phones, wireless base stations, video cameras, and other IEEE-compliant powered devices

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WS-X4248-RJ45V

- 48-port
- 10/100 (RJ-45)
- Cisco IOS Software Release 12.2(18)EW or later
- IEEE 802.3af PoE and Cisco prestandard
- Enterprise and commercial: Designed to power IP phones, wireless base stations, video cameras, and other IEEE-compliant powered devices

WS-X4248-RJ21V

- 48-port
- 10/100 (RJ-21)
- Cisco IOS Software Release 12.2(18)EW or later
- IEEE 802.3af PoE and Cisco prestandard
- Enterprise and commercial: Designed to power IP phones, wireless base stations, video cameras, and other IEEE-compliant powered devices with improved cable management RJ-21 connectors

Gigabit Ethernet (GBIC or SFP)

The Cisco Catalyst 4500 Series offers a variety of GBIC- or SFP-enabled gigabit solutions for high-performance Gigabit Ethernet uplinks and server farm connectivity. The five GBIC- or SFP-enabled gigabit line card options for the Cisco Catalyst 4500 Series include 2-, 6-, 18-, and 48-port versions. GBIC or SFP technology allows customers to intermix intra-building MMF connections and long-distance single-mode connections simply by changing the GBIC or SFP type. (See Table 2 for more information.)

WS-X4302-GB

- 2-port
- 1000BASE-X GBIC
- Cisco IOS Software Release 12.1(19)EW or later
- IEEE 802.3 standard Ethernet over fiber
- L2-4 Jumbo Frame Support (up to 9216 bytes)
- Enterprise and commercial: Designed for uplinks, server farms, and switch-to-switch applications
- Metro Ethernet: GBIC flexibility designed for network operators building the next generation of Metro Ethernet network

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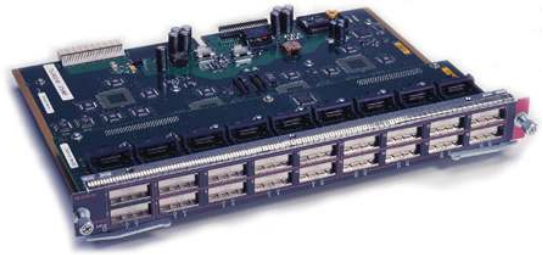
WS-X4306-GB

- 6-port
- 1000BASE-X (GBIC)
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3
- L2-4 Jumbo Frame Support (up to 9216 bytes)
- Enterprise and commercial: Designed for high-speed backbone, switch-to-switch applications or small server farms
- Metro Ethernet: GBIC flexibility, six ports of dedicated 1000BASE-X Gigabit Ethernet uplinks

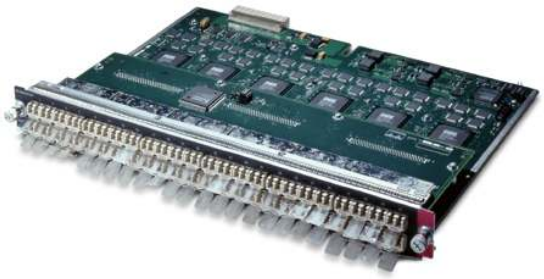
WS-X4418-GB

- 18-port
- 1000BASE-X (GBIC)
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3, IEEE 802.3x flow-control
- 2 ports of wire-speed 1000BASE-X Gigabit Ethernet uplinks
- 16 ports: 4:1 oversubscribed
- Enterprise and commercial: Designed for fiber to the desktop, switch-to-switch applications or small server farms
- Metro Ethernet: GBIC flexibility designed for network operators building the next generation of Metro Ethernet network



WS-X4448-GB-LX

- 48-port
- 1000BASE-LX (SFP)
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3, IEEE 802.3x flow-control
- Includes 48 1000BASE-LX SFP optics preloaded at the factory
- Bandwidth is allocated across six 8-port groups, providing 1 Gbps per port group
- Enterprise and commercial: Designed for fiber to the desktop
- Metro Ethernet: Optimized for service aggregation and business customer connectivity, Designed for service providers to run point-to-point Gigabit Ethernet over single-mode fiber



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WS-X4448-GB-SFP

- 48-port
- 1000BASE-X (SFP)
- Cisco IOS Software Release 12.2(20)EW or later
- IEEE 802.3x flow-control
- Bandwidth is allocated across six 8-port groups, providing 1 Gbps per port-group
- Enterprise and commercial: Designed for server farms and switch-to-switch applications
- Metro Ethernet: Designed for service providers to run point-to-point Gigabit Ethernet over single-mode fiber

WS-X4506-GB-T

- 6-port 10/100/1000 and 6-port SFP (Any combination of up to 6 ports can be active at one time.)
- 10/100/1000 RJ-45 PoE and 1000BASE-X (SFP)
- Cisco IOS Software Release 12.2(20)EWA
- PoE IEEE 802.3af and Cisco prestandard (RJ-45 only)
- Provides full line-rate Gigabit switching on all ports
- L2-4 Jumbo Frame Support (up to 9216 bytes)
- Designed to give customers the choice of RJ-45 with or without PoE and SFP without incurring extra costs
- Enterprise and commercial: High performance desktop connectivity and server farms. Designed to power IP phones, wireless base stations, video cameras, and other IEEE-compliant appliances
- Metro Ethernet: Designed for service providers to run point-to-point Gigabit Ethernet over single-mode fiber

Gigabit Ethernet over Copper

The Cisco Catalyst 4500 Series offers a variety of gigabit-over-copper solutions for wiring closets and server farms, enabling high-density gigabit connectivity to the desktop and servers over Category 5 copper cabling. The line card options for the Cisco Catalyst 4500 Series (Table 1) include a 24- and 48-port 10/100/1000BASE-T module in both PoE and non-PoE versions. These modules provide wiring closet investment protection by allowing Fast Ethernet desktops to migrate to Gigabit Ethernet in the future without replacing the switch line cards.

WS-X4424-GB-RJ45

- 24-port
- 10/100/1000 Module (RJ-45)
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3x flow-control
- Bandwidth is allocated across six 4-port groups, providing 1 Gbps per port group
- Enterprise and commercial: Designed for Gigabit-to-the-desktop and server-farm applications

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WS-X4448-GB-RJ45

- 48 port
- 10/100/1000 Module (RJ-45)
- Cisco IOS Software Release 12.1(8a)EW or later
- IEEE 802.3x flow-control
- Bandwidth is allocated across six 8-port groups, providing 1 Gbps per port group
- Enterprise and commercial: Designed for Gigabit-to-the-desktop applications

WS-X4548-GB-RJ45

- 48-port
- 10/100/1000 Module (RJ-45)
- Cisco IOS Software Release 12.1(19)EW or later
- IEEE 802.3x flow-control
- Bandwidth is allocated across six 8-port groups, providing 1 Gbps per port group
- More power efficient and more cost effective than the WS-X4448-GB-RJ45
- Enterprise and commercial: Designed for Gigabit-to-the-desktop

Gigabit Ethernet over Copper with Power over Ethernet

WS-X4524-GB-RJ45V

- 24-port
- 10/100/1000 (RJ-45)
- Cisco IOS Software Release 12.2(20)EW or later
- IEEE 802.3af and Cisco prestandard PoE, IEEE 802.3x flow-control
- Bandwidth is allocated across six 4-port groups, providing 1 Gbps per port-group
- Enterprise and commercial: Designed to power IP phones, wireless base stations, video cameras, and other IEEE-compliant powered devices

WS-X4548-GB-RJ45V

- 48- port
- 10/100/1000 (RJ-45)
- Cisco IOS Software Release 12.2(18)EW or later
- IEEE 802.3af and Cisco prestandard PoE, IEEE 802.3x flow-control
- Bandwidth is allocated across six 8-port groups, providing 1 Gbps per port-group
- Enterprise and commercial: Designed to power IP phones, wireless base stations, video cameras, and other IEEE-compliant powered devices

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SPECIFICATION SUMMARY

Table 1. Port Information for Line Cards

Line Card	Number of Ports	Port Speed	Port Type	Wire Rate	Cisco Catalyst 4500 Series Min/Max Ports		
					4503	4506/4507R	4510R
Fast Ethernet over Fiber Line Cards							
WS-X4124-FX-MT	24	100BASE-FX (MT-RJ)		Yes	24/48	24/120	24/168
WS-X4148-FX-MT	48	100BASE-FX	MMF MT-RJ	Yes	48/96	48/240	48/336
WS-X4148-FE-LX-MT	48	100BASE-LX10	SMF MT-RJ	Yes	48/96	48/240	48/336
WS-X4148-FE-BD-LC	48	100BASE-BX10-D	SMF Single LC	Yes	48/96	48/240	48/336
Fast Ethernet over Copper Line Cards							
WS-X4124-RJ45	24	10/100	RJ-45	Yes	24/48	24/120	24/168
WS-X4148-RJ	48	10/100	RJ-45	Yes	48/96	48/240	48/336
WS-X4148-RJ21	48	10/100	RJ-21	Yes	48/96	48/240	48/336
WS-X4232-RJ-XX	32	10/100	RJ-45 Modular uplink slot	Yes	32/64	32/160	32/224
WS-U4504-FX-MT	4	100BASE-FX		Yes	N/A	N/A	N/A
WS-X4232-GB-RJ	32 + 2	10/100 1000BASE	32 x RJ-45 2 x GBIC	Yes	32/64 2/4	32/160 2/10	32/224 2/16
Fast Ethernet PoE Line Cards							
WS-X4148-RJ45V	48	10/100	RJ-45 Cisco prestandard PoE	Yes	48/96	48/240	48/336
WS-X4224-RJ45V	24	10/100	RJ-45 PoE IEEE 802.3af and Cisco prestandard	Yes	24/48	24/120	24/168
WS-X4248-RJ45V	48	10/100	RJ-45 PoE IEEE 802.3af and Cisco prestandard	Yes	48/96	48/240	48/336
WS-X4248-RJ21V	48	10/100	RJ-45 PoE IEEE 802.3af and Cisco prestandard	Yes	48/96	48/240	48/336
Gigabit Ethernet (GBIC or SFP) Line Cards							
WS-X4302-GB	2	1000BASE-X IEEE 802.3	GBIC	Yes	2/4	2/10	2/16
WS-X4306-GB	6	1000BASE-X	GBIC	Yes	6/12	6/30	6/42
WS-X4418-GB	18	1000BASE-X	GBIC	2 ports FULL 16 ports 4-to-1*	18/36	18/90	18/126

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Line Card	Number of Ports	Port Speed	Port Type	Wire Rate	Cisco Catalyst 4500 Series Min/Max Ports		
					4503	4506/4507R	4510R
WS-X4448-GB-LX	48	1000BASE-LX	48 SFPs (included)	8-to-1*	48/96	48/240	48/336
WS-X4448-GB-SFP	48	1000BASE-X	SFP	8-to-1*	48/96	48/240	48/336
WS-X4506-GB-T	6 + 6	10/100/1000 1000BASE-X (SFP)	RJ-45 PoE IEEE 802.3af and Cisco prestandard	Yes	6/12	6/30	6/42
Gigabit Ethernet (Copper) Line Cards							
WS-X4424-GB-RJ45	24	10/100/1000	RJ-45	*4-to-1	24/48	24/120	24/168
WS-X4448-GB-RJ45	48	10/100/1000	RJ-45	*8-to-1	48/96	48/240	48/336
WS-X4548-GB-RJ45	48	10/100/1000	RJ-45	*8-to-1	48/96	48/240	48/336
Gigabit-over-Copper PoE Line Cards							
WS-X4524-GB-RJ45V	24	10/100/1000	RJ-45 PoE IEEE 802.3af and Cisco prestandard	*4-to-1	24/48	24/120	24/168
WS-X4548-GB-RJ45V	48	10/100/1000	RJ-45 PoE IEEE 802.3af and Cisco prestandard	*8-to-1	48/96	48/240	48/336

* The amount of oversubscription can be controlled by varying the number of ports used at 1000 Mbps. All ports can use Gigabit EtherChannel® or IEEE 802.3ad for high-speed interconnection applications. All oversubscribed ports use the standard IEEE 802.1x flow control (PAUSE frame) mechanism to control Gigabit Ethernet host traffic.

Table 2. GBIC and SFP Options

Interface Type	Name	Max Distance	Cable Type	Part Number
1000BASE-T	Category 5 twisted pair	100m	Category 5	• SFP: GLC-T • GBIC: WS-G5483
1000BASE-SX	Short wavelength	550m	Multimode fiber (MMF)	• SFP: GLC-SX-MM • GBIC: WS-G5484
1000BASE-LX	Long wavelength/long haul	10km on SMF 5km on MMF	SMF	• SFP: GLC-LH-SM • GBIC: WS-G5486
1000BASE-ZX	Extended distance	70km to 100km	SMF	• SFP: GLC-ZX-SM • GBIC: WS-G5487
CWDM	Coarse wavelength-division multiplexing	100km	SMF	• SFP: CWDM-SFP-XXXX • GBIC: CWDM-GBIC-XXXX
DWDM	Dense wavelength-division multiplexing			GBIC only

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Table 3. Fast Ethernet Optical Transmission Characteristics

			Launch Power	
Port Type	**BER**	**Nominal Wavelength (NM)**	**Max (dBm)**	**Min (dBm)**
100BASE-FX	2.5 x 10e-(10)	1270-1380	–14	–20
100BASE-LX10*	1 x 10e-(12)	1260-1360	–8	–15
100BASE-BX10-D**	1 x 10e-(12)	1480-1580	–8	–14

* Draft 1.3

** Draft 2.0

Table 4. Fast Ethernet Optical Reception Characteristics

			Receive Sensitivity	
Port Type	**BER**	**Nominal Wavelength (NM)**	**Max (dBm)**	**Min (dBm)**
100BASE-FX	2.5 x 10e-(10)	1270–1380	–14	–31
100BASE-LX10*	1 x 10e-(12)	1260–1360	–8	–25
100BASE-BX10-D**	1 x 10e-(12)	1260–1360	–8	–28.2

* Draft 1.3

** Draft 2.0

Table 5. Gigabit Ethernet Port Cabling Specifications

Port Type	**Wavelength (Nanometer)**	**Fiber Type**	**Core Size (Micron)**	**Modal Bandwidth (MHz/km)**	**Cable Distance**
Cisco 1000BASE-SX	850	MMF	62.5	160	722 ft (220 m)
			62.5	200	902 ft (275 m)
			50.0	400	1640 ft (500 m)
			50.0	500	1804 ft (550 m)
Cisco 1000BASE-LX	1300	MMF	62.5	500	1804 ft (550 m)
			50.0	400	1804 ft (550 m)
		SMF	50.0	500	1804 ft (550 m)
			9/10		32,810 ft (10 km)
Cisco 1000BASE-ZX	1550	SMF	9/10	–	44–62 miles (70–100 km)

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Table 6. Gigabit Ethernet Link Distance

Fiber Core	62.5um MMF	50um MMF	9/10um SMF
Fiber Modal Bandwidth	• 160/500 MHz-km • 200/500 MHz-km	• 400/400 MHz-km • 500/500 MHz-km	–
1000BASE-SX	• 220 m • 275 m	• 500 m • 550 m	–
1000BASE-LX/LH	• 550 m • 550 m	• 550 m • 550 m	10 km
1000BASE-ZX	–	–	70 to 100 km
Coarse Wave Division Multiplexing (CWDM)	–	–	100 km

PRODUCT SPECIFICATIONS

Table 7. Product Specifications

Feature	Description
Standards	• Gigabit Ethernet: IEEE 802.3z, IEEE 802.3x, IEEE 802.3ab • 1000BASE-X (GBIC), 1000BASE-SX, 1000BASE-LX/LH, 1000BASE-ZX, CWDM
EtherChannel Technology	• Gigabit EtherChannel: All 1000 Mbps ports • IEEE 802.3ad (Link Aggregation Control Protocol): All 1000-Mbps ports • Port Aggregation Protocol (PagP): Yes • Number of ports per tuple: 8 • EtherChannel and IEEE 802.3ad technology across line cards: Yes
Physical Dimensions	• Occupies one slot in the Cisco Catalyst 4500 Series platform • Dimensions (H x W x D): 1.2 x 14.4 x 16 in. (3.0 x 35.6 x 40.6 cm)
Environmental Conditions	• Operating temperature: 32º to 104ºF (0º to 40ºC) • Storage temperature: –40º to 167ºF (–40º to 75ºC) • Relative humidity: 10 to 90%, noncondensing • Operating altitude: –60 to 4000 m
Safety Conditions	Fiber optic lasers: Class 1 laser products
Safety Certifications	• UL 1950 • EN 60950 • CSA-C22.2 no 950 • IEC 950
Electromagnetic Emissions Certifications	• FCC 15J Class A • VCCI Class A • CE Marking • EN 55022 Class A • EN 55024 Class A • CISPR 22 Class A • AS/NZ 3548

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Feature	Description
	• NEBS Level 3 (GR-1089-CORE, GR-63-CORE) • ETSI ETS-300386-2

ORDERING INFORMATION

To place an order, visit the Cisco Ordering Home Page.

Table 8. Ordering Information

Part Number ("=" indicates 'spare')	Product Name
WS-X4124-FX-MT(=)	Cisco Catalyst 4500 Fast Ethernet Switching Module, 24 port 100BASE-FX (MT-RJ)
WS-X4148-FX-MT(=)	Cisco Catalyst 4500 Fast Ethernet Switching Module, 48 port 100BASE-FX MMF
WS-X4148-FE-LX-MT(=)	Cisco Catalyst 4500 Fast Ethernet Switching Module, 48-port 100BASE-LX10 SMF
WS-X4148-FE-BD-LC(=)	Cisco Catalyst 4500 Series 48-Port 100BASE-BX10-D Fast Ethernet Line Card for single strand of SMF
WS-X4124-RJ45(=)	Cisco Catalyst 4500 10/100 Module, 24 ports (RJ-45)
WS-X4148-RJ(=)	Cisco Catalyst 4500 10/100 Module, 48 ports (RJ-45)
WS-X4148-RJ21(=)	Cisco Catalyst 4500 10/100 Module, 48 ports telco (4 x RJ-21)
WS-X4148-RJ45V(=)	Cisco Catalyst 4500 Cisco prestandard 10/100, 48 ports (RJ-45)
WS-X4248-RJ21V(=)	Cisco Catalyst 4500 PoE IEEE 802.3af 10/100, 48-Ports (RJ-21)
WS-X4224-RJ45V(=)	Cisco Catalyst 4500 PoE IEEE 802.3af 10/100, 24 port (RJ-45)
WS-X4248-RJ45V(=)	Cisco Catalyst 4500 PoE IEEE 802.3af 10/100, 48 port (RJ-45)
WS-X4232-GB-RJ(=)	Cisco Catalyst 4500 32 port 10/100 (RJ-45), 2-Gigabit Ethernet (GBIC) module
WS-X4232-RJ-XX(=)	Cisco Catalyst 4500 32 port 10/100 (RJ-45), plus modular uplink slot
WS-U4504-FX-MT(=)	Cisco Catalyst 4500 Fast Ethernet Uplink Daughter Card, 4-port 100BASE-FX (MT-RJ)
WS-X4506-GB-T(=)	Cisco Catalyst 4500 6 port 10/100/1000 RJ-45 PoE IEEE 802.3af and 1000BASE-X (SFP)
WS-X4302-GB(=)	Cisco Catalyst 4500 Gigabit Ethernet Module, 2 ports (GBIC)
WS-X4306-GB(=)	Cisco Catalyst 4500 Gigabit Ethernet Module, 6 ports (GBIC)
WS-X4418-GB(=)	Cisco Catalyst 4500 Gigabit Ethernet Module, server switching 18 ports (GBIC)
WS-X4448-GB-LX(=)	Cisco Catalyst 4500 48 port 1000BASE-LX (SFP)
WS-X4448-GB-SFP(=)	Catalyst 4500 Gigabit Ethernet Module, 48 port 1000X (SFP)
WS-X4424-GB-RJ45(=)	Cisco Catalyst 4500 24 port 10/100/1000 Module (RJ-45)
WS-X4448-GB-RJ45(=)	Cisco Catalyst 4500 48 port 10/100/1000 Module (RJ-45)
WS-X4548-GB-RJ45(=)	Cisco Catalyst 4500 Enhanced 48 port 10/100/1000 Module (RJ-45)
WS-X4524-GB-RJ45V(=)	Cisco Catalyst 4500 PoE IEEE 802.3af 10/100/1000, 24 ports (RJ-45)
WS-X4548-GB-RJ45V(=)	Cisco Catalyst 4500 PoE IEEE 802.3af 10/100/1000, 48 Ports (RJ-45)

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FOR MORE INFORMATION

For more information about the Cisco Catalyst 4500 Series line cards, visit http://www.cisco.com/en/US/products/hw/switches/ps4324/index.html or contact your local account representative.

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